



Coastal Program Bulletin

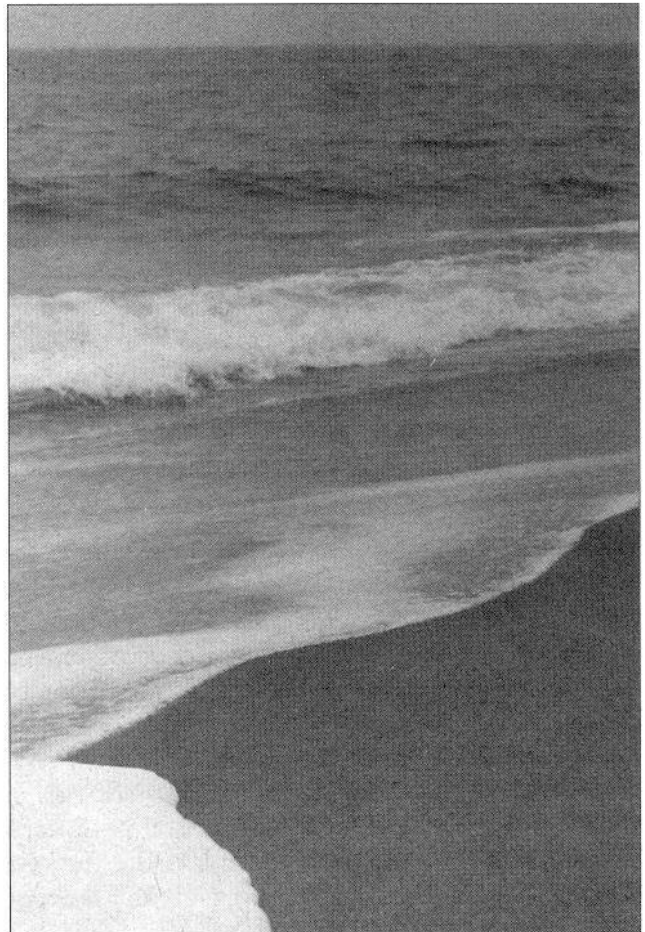
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THE HIGH TIDE LINE IN NEW HAMPSHIRE

Introduction

"The high water mark which bounds the shoreward extent of the public trust shorelands in New Hampshire is defined as, excluding abnormal storm events, the furthest landward limit reached by the highest tidal flow, commonly referred to as the highest spring or highest "syzygy" tide occurring during the nineteen year Metonic cycle...." (RSA 483-C)

This statutory definition of "high water mark," enacted by the New Hampshire Legislature in the spring of 1995, was intended to clarify the public's right to use and enjoy New Hampshire's beaches. It has generated much discussion and some confusion, in part because of the unusual term "syzygy." The New Hampshire Coastal Program has prepared and offers this technical bulletin on the new law to help clarify the purpose and meaning of the "high water mark" definition. The bulletin describes the recent controversy over the public's use of New Hampshire's coastal beaches, outlines what the Legislature did (and why), and explores the implications of the law for the seacoast.



History of the Issue

For many years, the public has enjoyed New Hampshire's beaches for general recreational purposes. Private landowners abutting the beach and the public using the beaches for the most part peacefully coexisted. But in recent years, "No Trespassing" signs have appeared on some New Hampshire beaches, sparking a controversy over the respective rights of the public and coastal property owners to use the beaches.

How much of the beach is the public allowed to use? Historically, the public has had the right to pass and repass, bathe, fish, fowl, navigate and recreate up to the "high water mark." However, the exact location of the "high water mark" on the beach, above which the public has no rights, had never been identified.

The Legislature decided to identify the location of the high water mark in statute to end the conflict over public use of the beaches. In doing so, the Legislature looked for answers to a number of questions, among which were the following:

1. Does New Hampshire law currently identify a particular coastal feature or event that defines the boundary of the public's rights? If not, what would be an appropriate line for the "public trust boundary?"
2. What respective rights do the public and private property owners have in tidal lands?
3. Would a law recognizing that the public trust extends to those lands "subject to the ebb and flow of the tide" infringe upon existing private property rights?

In discussing these issues, the Legislature formally asked for the assistance of the NH Supreme Court in the spring of 1994. The Court responded in the fall of 1994. After much deliberation, the Legislature passed House Bill 165 in the spring of 1995.

House Bill 165 created RSA 483-C, which contains the definition of "high water mark" given above. The public's right to use coastal beaches is now defined by statute to extend to the furthest landward limit of the highest normal tidal flow, or the highest spring tide.

Spring tides occur at the full and new moon, when the sun, moon and Earth are in a straight-line configuration (a celestial event known as syzygy).

At these times, the combined gravitational pull of the sun and the moon results in higher than average tides. The highest spring tide is the specific tidal event referenced in the law. It occurs approximately once every 19 years (see boxed text) and is predicted in published tide tables prepared by the National Oceanic and Atmospheric Administration (NOAA).

The Basis for the Law

Why did the Legislature choose the highest spring tide line to codify the boundary of the public's rights on New Hampshire beaches? What does the new law really mean? The questions asked previously are explored below more thoroughly to help illustrate the intent and reasoning behind the law.

1. Did New Hampshire law previously identify a particular coastal feature or event that defined the boundary of the public's rights? If not, what would be an appropriate line for the "public trust" boundary?

In its answer to the Legislature's 1994 request for assistance, the Supreme Court confirmed that the public trust in tidelands extends over lands "subject to the ebb and flow of the tide" and that the public in New Hampshire is entitled to use the beaches to the high water mark. The Court acknowledged that the physical location of the high water mark had not been settled by statute or court decision.

The Legislature determined that the physical line on the sand which best reflected the public's existing rights was the line marking the furthest landward limit of tidal flow, excluding storm events, being the highest of the spring tides. The Legislature's action was not intended to create new public rights, but to identify their historical limits.

The Legislature debated adopting a public trust boundary seaward of the highest spring tide line. The mean high tide line was the alternative given the most consideration. The mean high tide line is not a line drawn by any particular tidal event, but is an imaginary line that reflects the mathematical

mean of all high tides. The Legislature ultimately rejected the mean high tide line in favor of the highest spring tide line. A review of the Legislative Committee discussions indicates that choosing a line seaward of the furthest landward limit of the tide would have taken lands out of the public trust and deprived the public of its historical right to use the upper part of the beaches between the mean high tide line and the highest spring tide line.

2. What respective rights do the public and private property owners have in tidal lands?

The public and private property owners abutting tidal lands have overlapping rights to use and enjoy the coastal beaches in the intertidal zone. The State is generally considered to "own" the land seaward of the public trust boundary, which is the high water mark; however, the nature of state ownership of intertidal lands is different from most private fee ownership of land. The State holds the intertidal lands in trust for the public and is charged with protecting the public's rights to use and enjoy the beaches below the high water mark. At the same time, the State's "ownership" is burdened by significant property rights coastal property owners have in tidal lands.

The public is entitled to use the public part of coastal beaches for "all useful purposes," including activities such as swimming, bathing, and general recreation. The reader should note that the public's interest in lands below high water does not guarantee public access to those lands. A member of the public has no right to cross private property to reach the beach. The public must either get permission from the landowner or use access points developed for public use.

Abutting property owners have private rights over the beaches in addition to the rights they enjoy as members of the public. These rights, known as common law littoral property rights, developed over time through traditional use of these areas and court decisions.

Private property owners' rights are significantly greater than the rights of any one member of the public. For example, private property owners along tidal waters may, with proper permits, construct a wharf into the water, build a boathouse, and harvest marsh hay. They may also use and occupy the adjacent waters for a variety of recreational purposes.

The use made of the intertidal zone by both the public and abutting private property owners must be "reasonable." The public cannot unreasonably interfere with the rights of private property owners to use the beach and coastal waters. The private property owners cannot unreasonably interfere with legitimate public uses of the beach. Over time, the rights of both have traditionally been, and continue to be, balanced against each other to determine the limits of allowable use and occupancy.

3. Would a law recognizing that the public trust extends to those lands "subject to the ebb and flow of the tide" infringe upon existing private property rights?

A statutory recognition of intertidal lands as public trust lands does not infringe on private property rights. Private property owners have never owned the land below the high water mark in areas subject to the ebb and flow of the tide in New Hampshire (there may be some exceptions where tidal lands passed into private hands by specific grant of the king or Legislature). Private interests abutting these trust lands still enjoy expansive rights to use them, and the law does nothing to change that. Furthermore, the law does not authorize members of the public to access public trust lands via private property against the wishes of the owner.

What Drives the Tides and Other Changes in Sea Level?

Of the many factors that influence the rise and fall of the tides, the most commonly referenced are the gravitational attractions of the sun and the moon on the oceans. As the moon orbits around the Earth, the ocean water on the side of the Earth facing the moon is distorted by the moon's gravitational force, resulting in a "bulge" of water, that is, a high tide. Another bulge on the opposite side of the Earth is caused by the centrifugal force created by the Earth and moon rotating about one another. As the Earth turns beneath these bulges we observe a pair of high (and low) tides every 25 hours.

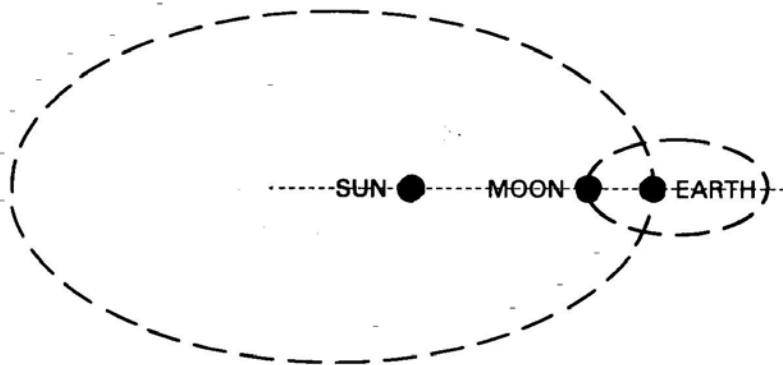


Two bulges of water, each being a high tide, exist on the Earth's surface. One bulge is caused by the gravitational force of the moon "pulling" on the ocean. The other bulge is caused by centrifugal force, which is created by the rotation of the Earth and moon about one another. To help understand centrifugal force, imagine you are holding a rope tied to a bucket of water. If you begin swinging the bucket in a constant, circular motion, the water will not fall out of the bucket. Centrifugal force pushes the water in an outward direction (toward the bottom of the bucket). This same force is what pushes the ocean into a second bulge.

The highest high tides (and the lowest low tides) tend to occur around the full and new moons (about every two weeks). These full and new moon tides are known as spring tides (note that the term "spring" has nothing to do with the seasons, but is a reference to these tides "springing" or "leaping" to a higher-than-average elevation). Spring tides occur when the sun, moon and Earth are aligned with one another ("syzygy" is the term for the celestial event when the sun, moon and Earth are in this alignment). At this time the gravitational forces of the sun and moon combine to produce a more dramatic rise and fall of the tide. The opposite of a spring tide is a neap tide, which occurs in between the full and new moons (first and third quarter moons). High tides during these periods are not as high, and low tides are not as low, because the sun and moon are located at 90 degrees to each other (relative to the Earth). Thus, their gravitational forces pull on the ocean in different directions, counteracting one another and resulting in a less dramatic rise and fall of the tide.

One might expect the different spring high tides during the year to rise to the same elevation. However, they do not. The height of the highest tide in each month during a particular year varies because the relative positions of the sun, moon, and Earth are different at the time of different syzygy events.

For example, the distance between the Earth and sun is at a minimum in January, due to the elliptical (not circular) orbit of the Earth around the sun. At this time the sun's gravitational pull on the oceans is strongest. When a new moon occurs around this time of the year, the enhanced pull of the sun, coupled with the pull of the moon, produces a very high spring tide. And if such an alignment occurs in conjunction with other factors (e.g. longer period astronomical effects which are repeatable over a 19-year period, also known as the Metonic cycle), the highest spring tide, the specific tidal event referenced in the law, will result.



The year-to-year differences in the highest high tide are relatively minor (perhaps only a few tenths of a foot), and they are predictable. The National Oceanic and Atmospheric Administration reports these predictions in the published tide tables referenced in the law.

Finally, a number of other factors cause some high tides to be higher than one might expect for astronomical reasons. Variations in wind, water temperature, and fresh water can change sea levels, independent of the forces that drive the tides. Of course, the timing of these events is important in terms of their effects on tidal height. These effects on sea level can be very large (especially in connection with hurricanes), but they are only as predictable as the weather or meteorology which causes them. High tides resulting from abnormal storm events, like hurricanes, are specifically excluded from the law.

What is "The Public Trust?"

The passage of House Bill 165 confirmed the public trust boundary along the New Hampshire coast. But, what is meant by the term "public trust?" The public trust is a dynamic, evolving concept that protects the public's rights to use and enjoy tidal and navigable waters, including the lands beneath and the living resources in those public waters. Waters and lands within the public trust are held by the State for the public, now and for future generations. Except in limited circumstances, public trust lands and water cannot be conveyed into private hands.

The public shares its right to use public waters and lands, including the coastal beaches, with the private property owners along the shore. The public right is dominant, but ultimately both private prop-

erty owners and the public must exercise their respective rights reasonably. Neither can unreasonably infringe on the rights of the other.

Who actually owns the public trust lands? The State is the owner of public trust lands, and it must manage them in a manner consistent with the public trust doctrine. As trustee of the coastal beaches, the State cannot sell them to private parties in the same way it can sell other state-owned property. The State has greater control over public trust lands than over private lands. Within the public trust boundary, the State can rely on its ownership interest to justify control of activities and does not depend solely on its regulatory (police) powers, which provide the basis for state regulation of privately-owned property for the public good.



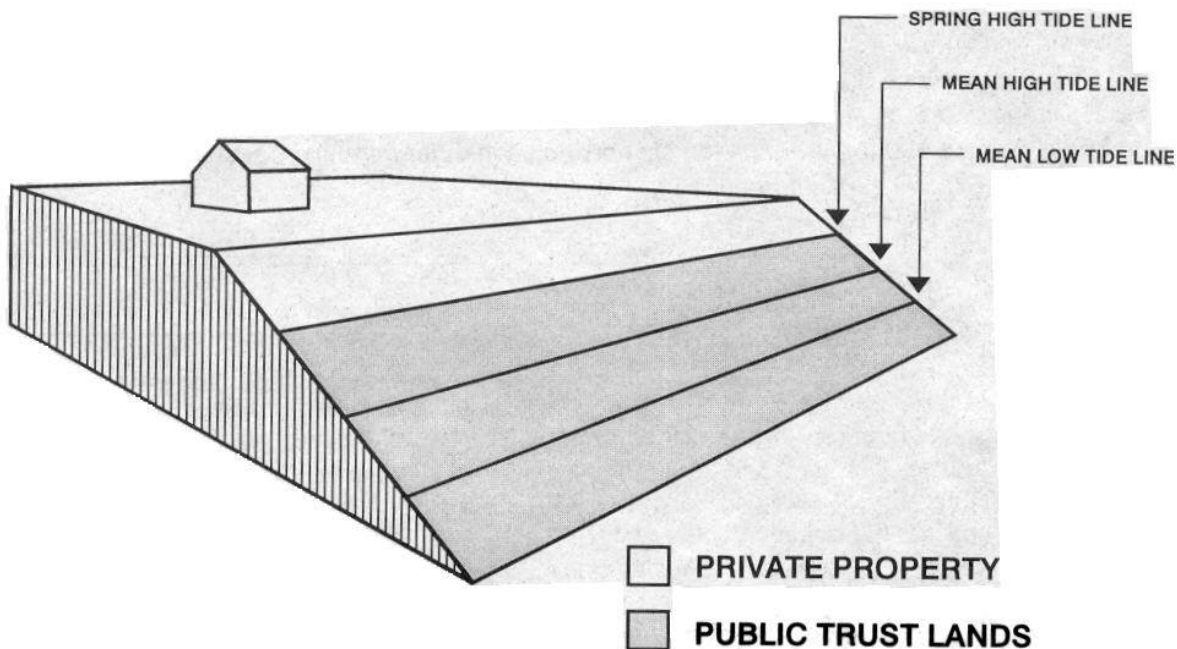
Identifying the Tidelines

What physical marker indicates the public trust boundary? How does one recognize the highest spring tide line at the beach? No one physical feature visibly divides public from private land along the coast. Although we speak of "tidelines," tides do not draw permanent lines on the sand. However, a number of physical features such as seawalls and wrack (debris) lines along the coast can help indicate what part of the beach is public (See boxed text on next page).

There are more exact methods of determining the location of the highest spring tide line. The highest spring tide line can be located using surveying techniques. The National Oceanic and Atmospheric Administration (NOAA) takes regular measurements of tidal elevations at tidal stations along the coast. Using this data, NOAA publishes predicted tidal elevations (which are specifically referenced in the law) that can be transposed to New Hampshire beaches using various adjustment factors. Surveying the location of a tideline is complicated,

requiring the land surveyor to address several technical issues, such as the extrapolation of tidal height data from various tidal stations to points of interest between stations. Accurately surveying any tidal elevation, be it highest spring tide or mean high tide, requires resolution of these technical issues.

Will the location of the highest spring tide line change over time? Yes, and necessarily so. Since the tide is dynamic and so is the coast, any tidal line chosen as the coastal boundary between private and public lands will move over time. Short term change is usually small. The highest spring tide line (and all other tide lines) shifts somewhat with each 19-year Metonic cycle. In the long term, erosion, sedimentation, sea level rise, and other natural or manmade changes to the seacoast may cause more significant changes to the public trust boundary. This is not a new problem. State property law has traditionally recognized that property lines along water bodies, including the sea, change as a result of natural phenomena.



Indicators of the Highest Spring Tide at the Beach

When at the beach there are several types of indicators that one can look for to indicate which part of the beach is public. These features only approximate where the high water mark is, but they provide reasonably good estimates. A brief summary of these indicators' usefulness and limitations for indicating the location of the high water mark is given below.

SEAWALLS - These can be reasonably good indicators of the location of the high water mark, since they are built to protect coastal property from the sea. Property landward of a seawall generally will not be "public trust land." If the highest spring tide line actually rises to the base of the seawall, then the land immediately seaward of the wall is in the public trust. In many locations, however, it is likely that the highest spring tide line is some distance seaward of the base of the seawall. This would be especially true if the seawall was built to only protect against unusual storm events.

WRACK LINES - The "wrack" or "strand" line, a line of debris deposited by the last high tide, can also indicate the location of the high water mark. A number of wrack lines (representing the elevation of several previous high tides) may be visible along the beach, especially along the Atlantic Coast. These lines probably do not represent the location of the highest spring tide (its wrack line, deposited once every 19 years, will be swept up or blown away over time), but members of the public can be reasonably sure that they are on public trust land if they stay seaward of the wrack line(s) visible on the beach.

These and other field indicators can only provide an estimate of the location of the high water mark in tidal areas. However, the general public and private property owners throughout New Hampshire's history have generally been "reasonable" with respect to their use of the beaches. Use of the indicators listed above should suffice so long as these parties continue the New Hampshire tradition of showing each other mutual respect and consideration in their use of the state's beaches.

Summary

In 1994, the NH Supreme Court confirmed that the public has rights along the coast up to the high water mark, although the Court declined to define the term. The Legislature, to remain consistent with historical practice and case law, has now defined "high water mark" as the elevation of the highest spring tide. The legislative definition of "high water mark" was intended to confirm the public's pre-existing right to use and enjoy the coastal beaches, not to extend that right.

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